

# Chapter 4

## The knowledge of teenagers and their mothers about cervical cancer prevention and HPV vaccines

Renata Bajcarczyk<sup>1</sup>, Renta Florek<sup>2</sup>, Dorota Kozieł<sup>3</sup>

<sup>1,2</sup> State Higher Vocational School in Tarnobrzeg, Department of Social and Humanistic Studies

<sup>3</sup> The Jan Kochanowski University in Kielce, Department of Medicine and Health Studies

<sup>1</sup> <https://orcid.org/0000-0003-4316-7807>

<sup>2</sup> <https://orcid.org/0000-0003-0387-6975>

<sup>3</sup> <https://orcid.org/0000-0001-8114-1814>

DOI 10.34697/66007-45-1-2020-4

### Abstract

**Introduction:** Infection with highly oncogenic types of HPV is associated with the development of cervical cancer in 70–80% of cases. Primary prevention of cervical cancer is based on education and vaccination of girls aged 11–12 before sexual initiation (PTG recommendations). HPV vaccination is not obligatory. The aim of the study is to examine the knowledge of women and their daughters about the prevention of cervical cancer in terms of cytological tests, HPV infection, and vaccines against HPV.

**Material and methods:** The research group consisted of female students of two secondary schools in Tarnobrzeg and their mothers. The research method employed was a questionnaire created by the author.

**Results:** There were 105 correctly fulfilled questionnaires from daughters and 46 from mothers. 50% of mothers have knowledge that cytological examination should be done every year, 54% know the proper time for examination. Mothers and daughters have the knowledge about cytological examinations, know the relation between HPV infection and cervical cancer. Both groups are in favour of vaccinations (mothers 60.8% daughters 80%). Only 8.6% of mothers have vaccinated their daughters, however 59.04% of daughters would like to have HPV vaccination.

**Conclusions:** In the study group, both mothers and daughters have knowledge about cytological examination and the relationship between HPV infection and the development

of cervical cancer; the mothers know how HPV infection occurs. However, the mothers' knowledge about HPV vaccination is insufficient as they do not know about the vaccines, they do not know when to vaccinate their daughters, and they are afraid of the side effects of vaccination.

**Key words:** HPV infection, vaccine, prophylactics, cervical cancer

## Abbreviations used in the text

HPV – Human Papilloma Virus

WHO – World Health Organization

IARC – International Agency for Research on Cancer

## Introduction

In 2008, Professor Harald zu Hausen received the Nobel Prize for the discovery of the human papillomavirus [125]. Currently, about 200 types of this virus are known and a further dozen or so are in the process of being identified. According to American data, over 50% of sexually active people (both women and men) may be temporarily infected with HPV during their lives [126]. The virus types that are low-oncogenic, i.e. type 6, 11, 42, 43, 44 and 53, are responsible for benign neoplasia and papillary epithelial hyperplasia in type of condylomata acuminata and condylomata plana [127]. The highly oncogenic types, i.e. 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 68, coexist with malignant neoplasia and cervical squamous cell carcinoma [128]. HPV infection is also associated with throat, rectal and penile cancer. Research conducted by IARC in 11 countries showed the presence of HPV 16 DNA and HPV 18 DNA in 70% of squamous cell carcinomas and 80% of cervical glandular carcinomas [126]. IARC reports that in 2018, 570,000 cervical cancers were detected worldwide and 310,000 women died of this disease [126].

Vaccinations are undoubtedly one of medicine's greatest achievements and have safely reduced the number of diseases that once decimated populations. Experts estimate that around 122 million people owe their lives to vaccines. However, since the creation of the first smallpox vaccine by

Edward Jenner, there have been voices that have undermined the safety and effectiveness of vaccination [128]. Anti-vaccination movements have been somewhat successful, as evidenced by the increase in the number of unvaccinated children [128]. In Poland, apart from compulsory vaccinations, there are also recommended vaccinations which are not financed by the state. Local governments often contribute to the financing of the latter by funding vaccinations for citizens. Most often, flu vaccinations are funded. Recommended vaccinations include vaccines against the HPV virus. The first vaccine against the HPV virus was introduced to the market in the USA in 2006 under the name Gardasil, whereas in Poland it is known as Silgard. This (quadrivalent) vaccine protects against infection with four types of virus: 16, 18, 6 and 11. Since 2007, the Cervarix vaccine has also been available, which protects against two types of virus: 16 and 18 [129]. In 2014, Gardasil 9 vaccine was launched on the market; it protects against 9 types of virus: 6, 11, 16, 18, 31, 33, 45, 52 and 58; seven of these types are highly oncogenic viruses [130]. The risk of adverse reactions to HPV vaccines is low, with about 25,000 side effects of human papillomavirus vaccines reported in the US between 2006 and 2014, 90% of which are classified as mild (subfebrile condition, itching at the site of injection, moderate fever) [131]. The WHO recommends the introduction of HPV vaccines for 9–14-year-old girls and boys [132]. In 2012, a common standpoint of the Polish Gynecological Society and the Polish Pediatric Society was published which recommended routine vaccinations for girls aged 11–12 years and for girls aged 13–18 years who had not been vaccinated previously [133]. Vaccinated women should undergo cytological screening because the vaccine does not protect against all types of this virus. Due to the protection it offers against some types of penile, head, cervical and anal cancer (and to break the HPV transfer chain), in some countries boys are also vaccinated (e.g. Australia, Switzerland, Israel) [132]. WHO experts predict that if we do not start vaccination, the number of cervical cancer deaths will increase by 50% within 20 years [134]. In 2020, the 73rd World Health Assembly will discuss the global strategy for 2020–2030 to accelerate the elimination of cervical cancer [134].

## The aim of study

The aim of the study was to examine the knowledge of women and their daughters concerning the prevention of cervical cancer, including cytological tests, HPV infection, and vaccines against HPV.

## Material and methods

The research group consisted of students from two secondary schools in Tarnobrzeg (Mikołaj Kopernik Secondary School and Hetman Jan Tarnowski First Social Secondary School) as well as the students' mothers. The research was conducted in April and May 2019. Interested students and their mothers were invited to participate in the study. Due to the low number of questionnaires returned by mothers, the results were not developed in relation to the mother–daughter pairs but were counted separately. The research method was a diagnostic survey, for which the author's questionnaire was used. The questionnaire for girls included questions concerning cytology and the time of the first cytological examination, the HPV infection method, the connection between HPV and cervical cancer, the general attitude to vaccination and HPV vaccines, and willingness to be vaccinated. The mother's questionnaire was extended to include questions about the frequency of cytology tests, whether women want to vaccinate their daughters, the reasons for not vaccinating, what vaccine they would choose, and whether they consider education on cervical cancer prevention sufficient.

## Results

Pupils were encouraged to participate in the study: 105 correctly completed questionnaires were received, while the number of questionnaires returned by mothers was much lower (46 correctly completed questionnaires). Pupils participating in the study were aged 16 years (9.52%), 17 years (36.19%) and 18 years (54.28%). The age of the mothers was 37

to 54 years; the average age was 45.7 years. In the studied group of women, 47.82% had secondary education, 41.3% had higher education, and only 10.86% had vocational education. The vast majority of women (76%) live in Tarnobrzeg, while 23.9% live in rural areas. As far as the family situation is concerned, 76.08% are married, 17.39% are divorced and 6.52% are single. When asked about their financial situation, 63.04% of women described it as good, 21.73% as average, 15.21% as very good, and none declared a bad financial situation.

The question about cytological examination was addressed to all the subjects: mothers and daughters. The frequency of answers is gathered in Table 7.

*Table 7. Knowledge of mothers and daughters about cytological examination*

Cytology is tested by:		Mothers	Daughters
collecting swabs from the cervix	N	38	88
	%	82.6	83.8
female genital imaging methods	N	4	13
	%	8.7	12.4
assessing vaginal cleanliness	N	4	3
	%	8.7	2.9
assessing the level of female sex hormones	N	-	1
	%	-	0.9

The vast majority of the respondents (over 80% in both groups, both women and their daughters) replied that cytology is a test that consists in taking swabs from the cervix. In the group of mothers, 8.7% of women believe that cytology refers to female genital imaging and vaginal cleanliness testing. In the group of daughters, 12.4% believe that cytology is a method of female genital imaging; 2.9% of girls think that cytology is a test of vaginal cleanliness, and only 0.9% think that it is a test of the level of female sex hormones.

Mothers were asked how often they perform a cytological examination and in which phase of the cycle they should request the examination.

In the group of mothers, 50% declared that they know that they should have a cytological examination every year, 34.7% once every 3 years, and 15.2% once every 5 years (Figure 2).

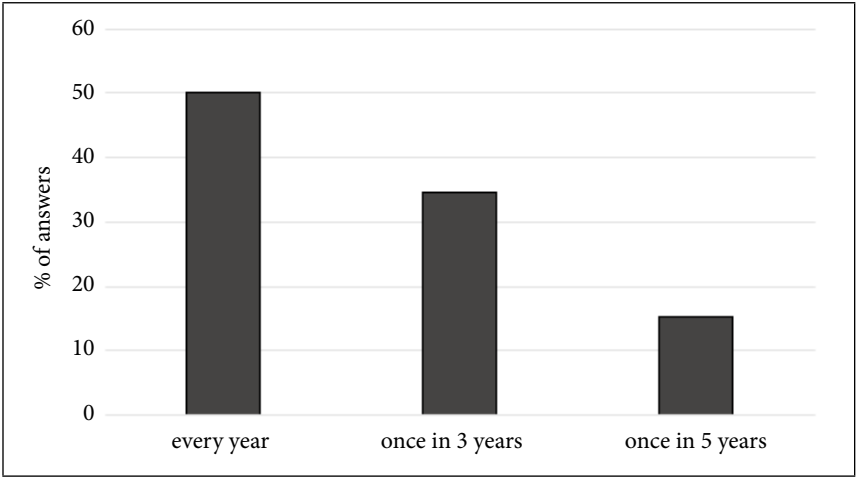


Figure 2. How often should cytological examination be done? Answers in the group of mothers

Table 8 shows the women’s knowledge about when cytological examination should be done.

Table 8. How often should cytological examination be done? Answers of women by education, place of residence and material situation

Cytological examination	Education			Place of residence		Financial status		
	Higher	Secondary	Vocational	City	Village	Very good	Good	Average
Once a year	n 12	10	1	17	6	2	18	3
	% 52.2	43.5	4.3	73.9	26.1	8.7	78.3	13
Every 3 years	n 10	6	-	13	3	3	9	4
	% 62.5	37.5		81.3	18.7	18.7	56.3	25
Every 5 years	n 6	-	1	5	2	2	2	3
	% 85.7		14.3	71.4	28.6	28.6	28.6	42.8

54.3% of the respondents stated that a cytological examination has to be performed between the 10th and 20th day of the cycle, 17.3% a few days before menstruation, 15.2% think that it does not matter, while 13.2% of women admit that they do not know when they should have a cytological swab (Figure 3).

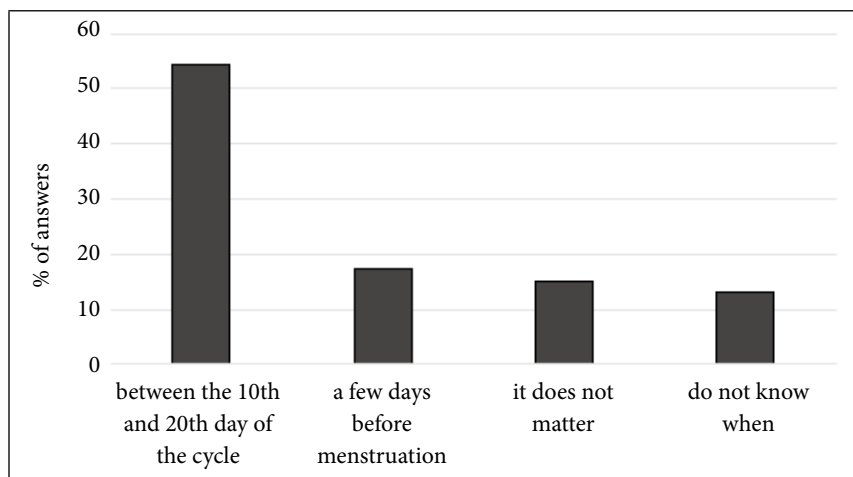


Figure 3. When should women come for a cytological examination?

The group of girls was asked when the first cytological examination should be performed: 68.57% claimed that it should be after the onset of sexual intercourse, 12.38% stated before 25 years of age, 2.85% before 30 years of age, 10.47% claimed that no later than 3 years after sexual initiation; 5.71% did not know when the first cytology should be performed.

Girls were asked if condoms protect against HPV infection: 88.6% responded that it reduces the risk of infection, 6.67% that it offers complete protection, while 4.7% stated that condoms do not protect against HPV infection.

The relationship between cervical cancer and HPV infection is known by 86.9% of mothers and 74.3% of daughters; 4.4% of mothers and 20.9% of daughters associate frequent intimate infections with cervical cancer;

8.7% of mothers and 3.9% of daughters indicate HIV infection as the cause of cervical cancer; only 0.9% of daughters indicated other causes of the disease, e.g. genetic as shown in Figure 4.

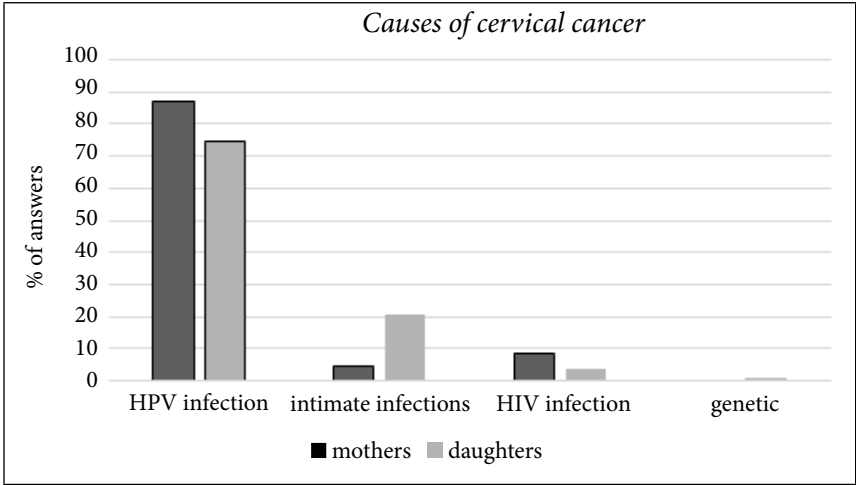


Figure 4. The surveyed women’s opinions on the causes of cervical cancer

The most common supporters of vaccination were women with higher education (67.85%), married women (89.28%), in good financial situation (71.42%), city residents (67.85%).

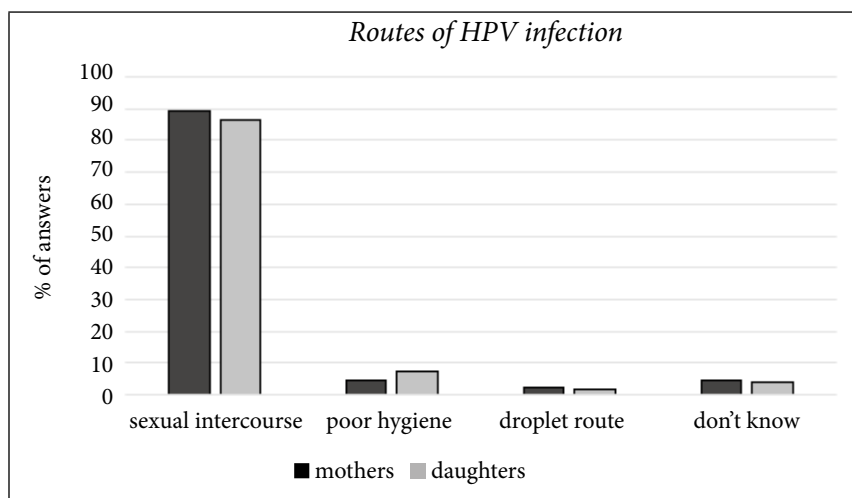
Opponents of vaccination are women with higher and secondary education (50%), married women (50%), in good financial situation (75%) and city residents (75%). In the group of women who have no opinion on vaccination, women with higher education predominate (50%), followed by married women (57.14%), in a good financial situation (42.85%) and rural women (71.42%). The results are gathered in Table 9.



*Table 9. Approach to vaccination: women surveyed by education, marital status, place of residence and financial situation*

Approach to vaccination	Education				Marital status			Financial situation			Place of residence	
	Higher		Sec- ondary	Voca- tional	Married	Divorced	Single	Very good	Good	Aver- age	City	Village
Supporters 28	%	67.85	28.57	3.57	89.28	7.14	3.57	14.28	71.42	14.28	67.85	32.14
	N	19	8	1	25	2	1	4	20	4	19	9
Opponents 4	%	50	50		50	25	25		75	25	75	25
	N	2	2	–	2	1	1	--	3	1	3	1
No opinion	%	50	42.85	7.14	57.14	35.71	7.14	21.42	42.85	35.71	28.57	71.42
	N	7	6	1	8	5	1	3	6	5	4	10

The surveyed women and their daughters were asked how HPV infection occurs. The frequency of answers is shown in Figure 5: 89.2% of mothers and 86.6% of daughters indicated sexual intercourse; 4.3% of mothers and 7.6% of daughters claimed that it occurs due to poor hygiene such as unclean underwear; 2.1% of mothers and 1.9% of daughters indicated the droplet route of infection; 4.4% of mothers and 3.9% of daughters admitted that they did not know the route of infection.



*Figure 5. Methods of HPV infection in the opinion of the surveyed women*

Mothers and daughters were asked about their general attitude to vaccination and their opinions on HPV vaccines. 60.8% of mothers and 80% of daughters declare themselves to be in favor of vaccination; 8.7% of mothers and 6.6% of daughters are against vaccination, which is worrying for a rather large group; 30.5% of mothers and 13.4% of daughters have no opinion (Figure 6).

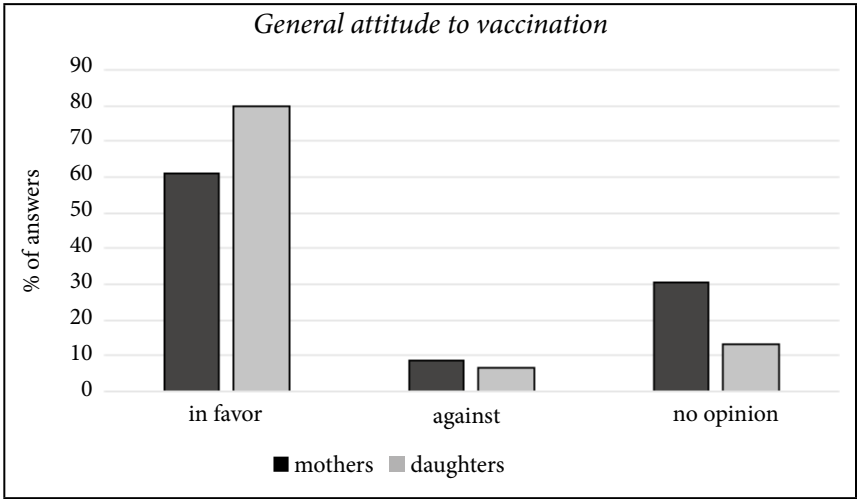
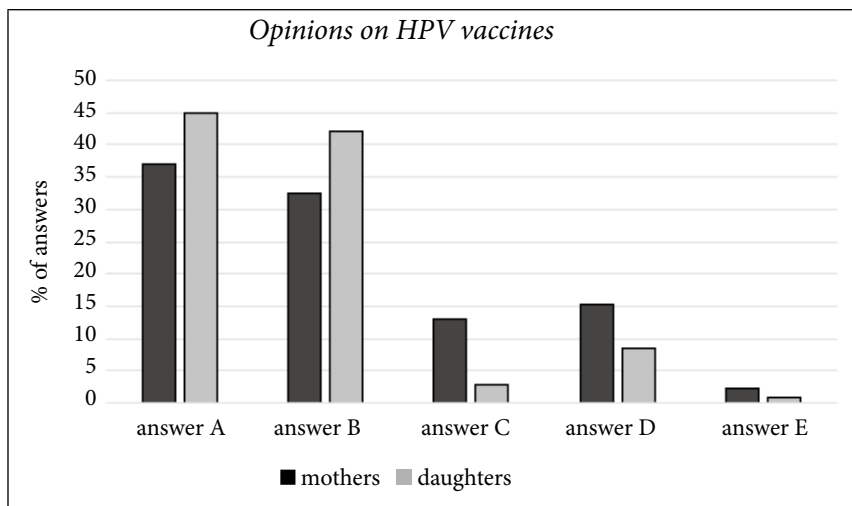


Figure 6. Approach to vaccination in the group of tested women

Comparable results were obtained for responses A and B as shown in Figure 7: 36.9% of mothers and 45.6% of daughters believe that vaccination is necessary; 32.6% of mothers and 42% of daughters think that vaccination is not necessary but worthwhile. Answer C (the vaccine only profits pharmaceutical companies) was selected by 13.04% of mothers and only 2.9% of daughters. 15.3% of mothers and 8.6% of daughters had no opinion. Vaccine is a trend created by the media is the view of 2.16% of mothers and 0.9% of daughters.

The group of mothers was asked whether cytological tests can be abandoned after HPV vaccination: 84.8% of the women replied no, 4.3% answered affirmatively, and 10.9% did not know.



*A/ Vaccination is necessary because too many women die of cervical cancer. B/ Vaccination is not necessary but being vaccinated is worthwhile. C/ The vaccine only profits pharmaceutical companies that want to make as much money as possible. D/ I have no opinion. E/ It is a trend created by the media.*

Figure 7. Opinions of the women surveyed on HPV vaccines

Women were asked if they had vaccinated their daughters: only 8.7% answered affirmatively and 91.3% declared that they had not. The question about the reason for not vaccinating was open-ended and the women gave the following reasons: high cost of vaccination (8 answers), too little information about vaccines (7 answers), information about the negative effects of vaccination (4 answers), daughter is too young (2 answers) or has not yet started sexual relations (2 answers). The answers do not sum up correctly because not all women answered this question.

Mothers who had vaccinated their daughters were between 51 and 54 years old: 75% were city residents with higher and secondary education, and all declared good financial status. The vaccinated teenagers are students of the Nicolaus Copernicus High School, which is a state school.

However, the daughters were asked whether they would like to be vaccinated against the HPV virus: 59.04% answered yes, 5.76% did not want to be vaccinated, 31.4% did not yet know, and 3.8% had already been vaccinated.

The interviewed women were asked if they would vaccinate their daughters if the local government or the National Health Fund financed it: 54.3% said yes, 28.3% said no, and 17.4% said they did not know what to do. When asked what vaccine they would choose, 43.4% answered that they did not know, 23.9% would choose a 2-valent vaccine, 17.4% a 4-valent vaccine, and 15.3% a 9-valent vaccine as shown in Figure 8.

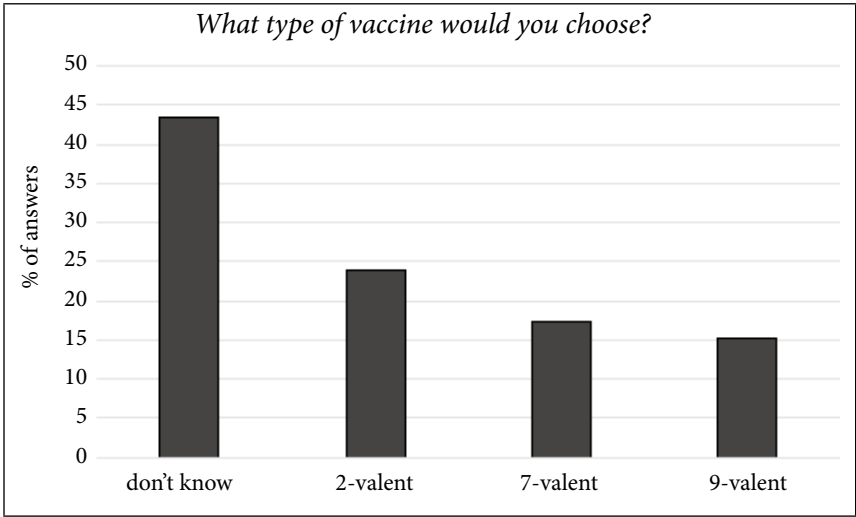


Figure 8. Choice of HPV vaccine in the group of women

The surveyed women were asked if education on cervical cancer prevention is sufficient: 21.7% answered affirmatively, and 78.3% thought that there is insufficient education on cervical cancer prevention.

Discussion

Prevention, especially primary prevention, is the most effective way to reduce the risk of cancer of all kinds, including cervical cancer. Primary prevention includes sexual education and vaccination. The available vaccines against the HPV virus only protect against the highly oncogenic types. These vaccines are not obligatory in Poland, and the decision to vaccinate is taken only by parents. Research by Falenczyk K. et al.

has shown that only 52.9% of parents see the need to vaccinate their child with recommended vaccinations [128]. The Polish Gynecological Society recommends vaccination of girls before sexual initiation and the recommended age is 11–12 years. Due to the high cost of vaccination (1 dose costs around 500 PLN; the whole cycle costs about 1500 PLN) it is a considerable expense in the family budget. Parents' awareness and education must be sufficiently high for them to see the necessity of vaccinating their daughters. Research on cervical cancer prevention is dominated by early detection of disease symptoms, cytological screening, and assessment of health behaviors, including sexual behaviors of women. Studies carried out in the UK have shown that eight years of vaccination of girls (2008–2016) reduced the prevalence of HPV in the population from 8% to 6.9% [135].

Słopiecka A. and Wiraszka G. examined the behavior of women after the occurrence of disease symptoms: about 20% of the respondents waited as long as 10 months after the occurrence of symptoms before they visited a doctor, which shows a low awareness of health issues among the respondents. The women who consulted a doctor immediately after observing the symptoms (14.5%) were young women up to 35 years of age; no statistical differences were found in terms of education and place of residence [136]. In a study by Machaj A. et al., 13.2% of the respondents admitted to risky sexual behaviors (intercourse with a random partner without the use of a condom), while sexual contact under the influence of alcohol, drugs and other psychoactive substances most frequently (29.5%) occurs among non-religious persons [137]. PTGiP recommends a cytological screening test once every 3 years; a test every 12 months is recommended for women at risk (HIV-infected, HPV-infected, treated for intraepithelial neoplasia) [138]. Our own research shows that 50% of women have a cytological examination every year; 34.7% state that they have a cytological examination once every 3 years. This group includes women with higher education, city residents, and those with good financial status. In the study of Leszczyńska K. et al., 24% of women under 30 and 28% over 30 believe that cytological examination should be performed every 3 years [139].

In our own research, 74.2% of girls and 86.9% of their mothers know that cervical cancer is associated with HPV infection. In a study by Nowicki A. et al., more than half of the surveyed women in the group associated with health care considered HPV infection to be the main cause of cervical cancer; in the group not associated with health care, only 13% indicated the link between HPV infection and cancer [140]. In these studies, in both groups more than half of the women would have been vaccinated against HPV if it had been possible [140].

In the studies conducted by Stefanek A. and Durka P., there were no statistical differences in terms of knowledge about the existence of the HPV vaccine among women of different age groups and education levels. The differences were only due to the place of residence: fewer women in rural areas and small towns knew about the HPV vaccine [141]. In the studies of Lewandowska A. et al., women up to the age of 45 displayed more knowledge than older women [142]. In our research, 80% of girls and 60.8% of mothers declared themselves in favor of vaccination. When asked about the HPV vaccine, in both groups most respondents (36.9% of mothers and 45.5% of daughters) stated that vaccination is necessary because too many women die of cervical cancer. The next largest group of respondents (mothers 32.6% and daughters 41.9%) stated that vaccination is not necessary but is worthwhile. Thus, the women tested were in favor of HPV vaccination, but only 8.6% of the respondents answered positively when asked if they had vaccinated their daughters. In the group of daughters, 59.04% expressed a desire to be vaccinated, 5.7% did not want to be vaccinated, and 31.4% did not know.

HPV vaccination is not mandatory and is not reimbursable; mothers cite the financial cost as one of the main causes for this. If the cost of the vaccine were covered by the local government or the National Health Fund, 54.3% of women would vaccinate their daughters, 28.2% would not want to vaccinate their daughters, and 17.3% did not know. In a study by Szafransko-Baranska A. that was conducted on 134 girls who qualified for free vaccination as part of a local primary prevention program for cervical cancer, 93.7% of them participated in the

vaccination [143]. Parents had the opportunity to attend an educational meeting before making the decision: 60% of parents reported that the knowledge gained from the meeting had influenced their decision to vaccinate; 40% of parents made their decisions based on knowledge gained from the media [143]. In EU countries, 23 countries recommend routine vaccination of girls against HPV; only Austria also recommends vaccination of boys [144]. In Denmark, after the introduction of the vaccine, 90% of teenagers were vaccinated; however, as a result of information about negative effects of vaccination, this number dropped to 40%. Subsequently, an information campaign was undertaken which slowly restored confidence in the vaccine [145]. In California, surveys involving teenagers' parents, physicians and support staff at a primary health care facility were carried out: the interviews showed that parents were in favor of vaccination but still postponed the vaccination [146]. The level of HPV vaccination is influenced by reports of the negative effects of the vaccine, the way vaccination is financed, scientific evidence on its efficacy, and the ethical attitudes of parents [147–149].

Our own research shows that women do not have sufficient knowledge about vaccines, and 43.4% of them answered that they did not know what vaccine they would choose; 73.2% of respondents stated that the education on cervical cancer prevention is insufficient.

## Conclusions

1. The group of examined women and their daughters have knowledge about the cytological examination, the relationship between HPV infection and the development of cervical cancer; the mothers know how HPV infection occurs.
2. Mothers' knowledge of HPV vaccines is insufficient and they do not know which vaccine to choose.
3. Mothers declare themselves to be in favor of vaccination; however, the non-vaccination of daughters is explained by economic reasons and lack of knowledge about vaccines.

4. It is necessary to educate women in cervical cancer prevention, with particular emphasis on primary prevention, i.e. vaccination.
5. Parents should be directed to information about the safety of vaccines, the type of vaccines, and the age at which girls should be vaccinated.
6. The attention of local authorities and the National Health Fund should be drawn to financing at least some of the costs of vaccination or including HPV vaccination in the schedule of obligatory vaccinations.